

CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

- 1 1. A DC/DC converter for managing high voltage gain, the converter
2 comprising:
3 an input side having a high tap and a low tap;
4 an output side having a high tap and a low tap;
5 a converter circuit interconnecting said input side and said output
6 side; and
7 a steering branch having at least one rectifier and one of at least
8 one winding and a capacitor, said steering branch interconnecting said
9 input side with said output side.
- 1 2. A DC/DC converter according to claim 1, wherein said converter
2 circuit is selected from buck, boost, buck-boost, Cuk, Sepic, Zeta, half
3 bridge boost for low-line input, half bridge boost for high-line input, and
4 half bridge boost for universal-line input.
- 1 3. A DC/DC converter according to claim 1, wherein said steering
2 branch includes a rectifier in series with a winding.
- 1 4. A DC/DC converter according to claim 3, wherein said converter
2 circuit is a buck converter; and wherein said rectifier is connected to said
3 low tap of said input side and said low tap of said output side, and said
4 winding is connected to said high tap of said output side.
- 1 5. A DC/DC converter according to claim 3, wherein said converter
2 circuit is a boost converter; and wherein said winding is connected to said

3 high tap of said input side, and said rectifier is connected to said high tap
4 of said output side.

1 6. A DC/DC converter according to claim 3, wherein said converter
2 circuit is a buck-boost circuit; and wherein said winding is connected to
3 said low tap of said output side, and said rectifier is connected to said high
4 tap of said output side.

1 7. A DC/DC converter according to claim 1, wherein said steering
2 branch includes a rectifier having an input node and an output node, said
3 rectifier connected in series at the output node of said rectifier with a pair
4 of windings, and each of said pair of windings having an input node and an
5 output node.

1 8. A DC/DC converter according to claim 7, wherein said converter
2 circuit is a Cuk converter; and wherein said output node of said rectifier is
3 connected to both said low tap of said input side and said low tap of said
4 output side, said input node of a first winding of said pair of windings is
5 connected to said high tap of said input side, and said output node of a
6 second winding of said pair of windings is connected to said high tap of
7 said output side.

1 9. A DC/DC converter according to claim 7, wherein said converter
2 circuit is a Sepic converter; and wherein said output node of said rectifier
3 is connected to said high tap of said output side, said input node of a first
4 winding of said pair of windings is connected to said high tap of said input
5 side, and said output node of a second winding of said pair of windings is
6 connected to both said low tap of said input side and said low tap of said
7 output side.

1 10. A DC/DC converter according to claim 1, wherein said converter
 2 circuit is a Zeta converter; and wherein said output node of said rectifier is
 3 connected to both said low tap of said input side and said low tap of said
 4 output side, said output node of a first winding of said pair of windings is
 5 connected to both said low tap of said input side and said low tap of said
 6 output side, and said output node of a second winding of said pair of
 7 windings is connected to said high tap of said output side.

1 11. A DC/DC converter according to claim 1, wherein said steering
 2 branch includes a winding having an input node and an output node, said
 3 winding connected in series at said output node with a pair of rectifiers,
 4 each of said pair of rectifiers having an input node and an output node.

1 12. A DC/DC converter according to claim 11, wherein said output
 2 node of a first rectifier of said pair of rectifiers is connected to said high
 3 tap of said output side, and said input node of a second rectifier of said pair
 4 of rectifiers is connected to said low tap of said output side.

1 13. A DC/DC converter according to claim 12, wherein said converter
 2 circuit is selected from a half bridge boost circuit for low-line input, a half
 3 bridge boost circuit for high-line input, and a half bridge boost circuit for
 4 universal-line input.

1 14. A DC/DC converter according to claim 1, wherein said steering
 2 branch includes a capacitor connected to a rectifier, said capacitor having
 3 an input node and an output node, and said rectifier having an input node
 4 and an output node.

1 15. A DC/DC converter according to claim 14, wherein said converter
 2 circuit is a boost converter having center node joining a first inductor a

3 second inductor and a switch, said first inductor connected to said high tap
 4 of said input side, and said second inductor connected to an output
 5 rectifier, said output rectifier connected to said high tap of said output side.

1 16. A DC/DC converter according to claim 14, wherein said rectifier of
 2 said steering branch interconnects said center node with said second
 3 inductor, and said capacitor of said steering branch interconnects said high
 4 tap of said input side with both said second inductor and said rectifier of
 5 said steering branch.

1 17. A DC/DC converter according to claim 14, wherein said rectifier of
 2 said steering branch interconnects said center node with said second
 3 inductor, and said capacitor of said steering branch interconnects both of
 4 said low tap of said input side with said low tap of said output side with
 5 both of said rectifier of said steering branch and said second inductor.

1 18. A DC/DC converter according to claim 14, wherein said converter
 2 circuit is a buck-boost converter having a node connected to an output
 3 rectifier, said first node joining a magnetizing inductor and said high tap of
 4 said input side; and wherein said rectifier of said steering branch
 5 interconnects said first node with said output rectifier, said capacitor of
 6 said steering branch interconnects said low tap of said output side with
 7 both of said rectifier of said steering branch and said output rectifier.

1 19. A DC/DC converter according to claim 14, wherein said converter
 2 circuit is a Sepic converter having a center node connected to an output
 3 rectifier, said center node joining a capacitor with a first inductor, said first
 4 inductor connected to both of said low tap of said input side and said low
 5 tap of said output side, said capacitor connected to a second inductor, said
 6 second inductor connected to said high tap of said input side; and wherein

- 7 said rectifier of said steering branch interconnects said center node with
- 8 said output rectifier, and said capacitor of said steering branch
- 9 interconnects both of said low tap of said input side and said low tap of
- 10 said output side with both of said output rectifier and said rectifier of said
- 11 steering branch.

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